REMARKS

No claims are amended with this Amendment. Claims 21-23 are indicated as "Withdrawn", and are believed to be in condition for rejoinder.

In the present Action, the Examiner states that Applicant mischaracterized information presented in the previous response filed in this application. Applicant respectfully submits that, to Applicant's knowledge, all correspondence with the USPTO to date has been made in good faith and with honest belief as to the truth of all statements within said correspondence, and that no mischaracterization was ever intended at any point during prosecution of this application. Applicant has corresponded and will continue to correspond according to these good faith principles with the Examiner.

I. Rejection under 103(a) over Tobiasch in view of Snijder

The present Action rejects pending claims 1, 4-8, 10, 15-19, 24 and 25 under 35 U.S.C. 103(a) as obvious over Tobiasch et al. (Virus Genes 22(2):187-99 (2001)) in view of Snijder (J. Virol. 73(8):6335-6345 (1999)). Specifically, the rejection indicates in part that Tobiasch discloses all elements of the present claims ***except*** **ORF2** by teaching a DNA vaccination for the prevention of EAV in horses, and a vaccine composition having EAV ORF 5+7. The rejection further states that Snijder discloses ORF2, and that one skilled in the art would modify Tobiasch's disclosure to include ORF2 because Snijder teaches that ORF 2 is conserved in all arteriviruses, and that such conservation would provide for a broad range immune response against arteriviral structural proteins. In the alternative, the rejection also indicates that the skilled person would combine Tobiasch and Snijder because including wildtype ORF2 in a vaccine will augment the immunogenic effect of structural proteins ORF 5 and 7 with a reasonable expectation of success.

Prior correspondence in this application has included several discussions of unexpected results achieved by the present invention; the present Action states that prior discussions in this regard are unpersuasive, because they do not directly compare a construct of the present invention (ORF 2+5+7) with a construct of Tobiasch (ORF 5+7). While Applicant does not necessarily agree that prior submissions should be considered as unpersuasive, in an effort to further prosecution, Applicant notes that evidence of unexpected results is only one way to overcome a rejection under 35 USC 103(a).

As the Examiner is aware, under US patent practice, a document such as Tobiasch must be considered ***as a whole*** when considering obviousness under 35 USC 103, ***including portions that would lead away from the present invention***. In response to the above rejection, Applicant respectfully submits that Tobiasch as a whole, taken alone or in view of Snijder, in fact does lead the skilled person away from the teachings of the present invention, and thus the

present invention cannot be considered obvious in view of these disclosures for at least the reasons set forth below:

Specifically, Applicant respectfully directs the Examiner to entries in Tobiasch, Table 2 (page 195), that disclose results of vaccination using ORF expression vectors in mice:

- The 8th (last) entry, disclosing vaccination with a construct including the first 121 amino acids of the **large envelope glycoprotein of ORF5**, provided the *highest* immune response - **90%** of animals tested showed an immune response when compared with control.
- The 2nd entry (vaccine: **ORF 7/nucleocapsid protein**) shows that **80%** of animals tested experienced an immune response.
- The 3rd and 4th entries (vaccine: **non-truncated ORF 5**) show that **70%** and **50%** of animals experienced an immune response, respectively.
- The 5th entry (vaccine: ***combined ORF 5 and ORF 7 expression vector***), shows that **30%** of animals experienced an immune response.

Considering the above experimental results, one skilled in the art considering Tobiasch Table 2 would most certainly understand that **the best result** (immune response in 90% of animals) was achieved via administration of **truncated EAV ORF5 alone**, the second best result (immune response in 80% of animals) was found with a construct having ORF 7 alone, and the third-best results were achieved with non-truncated ORF 5 alone (immune response in 70-50% of animals). Significantly, the skilled person would immediately realize that administration of **ORF 5 and ORF 7 together** produced an immune response in only **30%** of the tested animals – a diminishment (e.g. attenuation) in immune response by up to 2/3 following the administration of either ORF 5 or ORF 7 alone.

Moreover, Tobiasch's discussion of Table 2 and related Figures 3-6 further teaches the skilled person that a significant immune response was found with **ORF 5 constructs alone** and an **ORF 7 construct alone** (Figs. 3, 4, 6), and that a construct having **ORF 5+7** (Fig. 5) agreed with other results mainly in that ORF 5+7 together were able to express corresponding gene products. See for instance Tobiasch page 194, left column, discussing the induction of significant immune response by DNA vectors:

> A significant immune response was detected when the animals were immunized with the recombinant plasmids pCR3.1-EAV-07-BX-C3 and pCR3.1-EAV-05-C14 harboring ORFs 7 and 5.... "

One skilled in the art would clearly understand that this statement does not relate to the ORF 5+7 construct of Figure 5 because the **second plasmid mentioned (pCR3.1-EAV-05-C14) was not used in the ORF 5+7 construct of Figure 5** (See e.g. Fig. 5 legend p. 197; Table 2 p.195). Data for the pCR3.1-EAV-05-C14 vector is actually found in Figure 4, disclosing administration of ORF 5 alone (without ORF 7). See also for instance Tobiasch page 194, right column lines 12-26,

expressly noting that data on the ORF 5+7 construct shown in Figure 5 agree with other study results in that gene products corresponding to ORF 5 and ORF 7 were made. The ORF 5+7 construct of Figure 5 is not only excluded from Tobiasch's discussion of inducing significant immune response, but also expressly distinguished from data on ORF 5 and ORF 7 alone as merely agreeing with other study results in that gene products were made.

Taken as a whole, while Tobiasch does disclose a vector construct including ORF 5+7, said vector clearly leads away from the ORF 2+5+7 construct of the present invention. Where one ORF (5 alone or 7 alone) significantly induced immune response, but two ORFs (5+7) greatly reduced immune response, the use of a third ORF (2+5+7) could not be reasonably foreseen by the skilled person to enhance the EAV immune response, whether considering Tobiasch alone or in view of Snijder. By showing that ORF 5 alone produced a significant immune response, and ORF 7 alone produced a significant immune response, but that together ORF 5+7 reduced the incidence of immune response by up to 2/3, Tobiasch must be fairly construed to teach away from combining ORF 2 with the ORF 5+7 construct. At least for the foregoing reasons, Applicant requests that the Examiner withdraw the present rejection.

Furthermore, in response to the Examiner's concern that ORF 2, 5 and 7 are obvious to combine in a vaccine merely because they are on the **same reading frame** (Tobiasch Fig. 1), Applicant respectfully emphasizes that Tobiasch teaches the skilled person that the inclusion of a combination of ORF 5 and ORF 7 (both on the same reading frame) in a single vector significantly attenuated immune response in mice. One skilled in the art, presented with this knowledge that the combined ORF 5+7 construct substantially decreases the immune response in mice, would not be taught that combining ORFs from the same reading frame would offer enhanced immune protection as a matter of course as the Examiner asserts, but rather, the skilled person reading Table 2 of Tobiasch would immediately understand that combining ORF 5 with ORF 7 would be undesirable, since this combination is not useful in inducing an immune response to EAV.

Also in response to the above-mentioned rejection, Applicant respectfully notes that Tobiasch does not teach DNA vaccination for prevention of EAV in horses. Rather, Tobiasch discloses the **desirability of developing** an efficient vaccine against EAV in horses (see for instance paragraph bridging left bottom to right upper column of page 188). Tobiasch expressly states its research is geared toward developing a model vaccine system in mice to study prevention of EAV in horses, but that further studies are required to assess the real protective potential of DNA vaccination in horses. (See e.g. Abstract; page 188 right column 1st full paragraph; page 198 2d full paragraph right column). Applicant recognizes that Tobiasch discloses that its research **may eventually help** develop a vaccine in a horse, but respectfully requests that the Examiner reconsider the statement in the rejection that Tobiasch actually DOES teach that DNA vaccination effectively prevents EAV in horses. Tobiasch expressly qualifies its results, and notes that results of its mouse model do not necessarily translate to protection in a horse. Accordingly, these statements necessitate that the skilled person must carry out a full research program to ascertain the effectiveness of the Tobiasch ORF vectors in

horses, since there is no evidence confirming that the mouse model can be automatically applied to equine subjects in eliciting a parallel response to EAV with these ORF vaccines.

In addition to the above, Applicant respectfully notes that the present invention was devised by two authors of the Tobiasch document – M. Giese and G. Darai. These gentlemen recognized the need for a vaccine for EAV, and engaged in research to consider EAV components that may be useful in preparing an effective EAV vaccine for horses. Early research did include the mouse model described by Tobiasch, and data shown therein. Only after performing additional research, did the two inventors discover that the present invention, namely the specific combination of ORF 2+5+7, provided for a highly effective EAV vaccine in horses, and filed the present patent application. It is Applicant's hope that the above discussion clarifies that the present invention was not actually taught in any way by Tobiasch, but rather is the result of further research and inventive endeavor.

With regard to the Examiner's statement that the skilled person would combine Tobiasch with Snijder because the Snijder Abstract teaches conservation of ORF2a between viruses in the same family as EAV, in addition to the above, and to those arguments already of record, Applicant respectfully notes that Snijder page 6338 (right column 3d full paragraph) states that ORF 2a (E protein), like all other arterivirus structural proteins, is most conserved between LDV and PRRSV (43% identical residues), and that EAV E occupies an intermediate position, with SHFV being most divergent.

II. Rejection under 102(b) over Chirnside

At page 10 of the Action, the Examiner rejects claims 1, 4-7, 15-18, 24 and 25 under 35 USC 102(b) as anticipated by Chirnside et al. (US 5,773,235). The Examiner states that the term "comprising" in front of the word "consisting of" is an open limitation, and that the instant claims read on a nucleic acid sequence of ORF2 to ORF7.

In response, Applicant respectfully submits that the claim 1 term "said vaccine comprises" refers to the vaccine composition as a whole, which may include for instance a pharmaceutically acceptable carrier (claim 10), IL-2 (claim 9), and other vaccine components. The term "a nucleic acid encoding an EAV sequence consisting of open reading frame (ORF) 2, ORF 5 and ORF 7" is meant to expressly limit nucleic acid in the vaccine to ORFs 2, 5 and 7; i.e., the vaccine as claimed does not include any other EAV ORFs.

While appreciating the Examiner's concern, Applicant respectfully notes that one skilled in the art would not expect that the term "consisting of" to be included in the claim for any purpose; a reading of the claim as including ORFs 2, 3, 4, 5, 6 and 7 renders the term meaningless, contrary to general principles of claim construction. In view of the above statements and availability of prosecution documents, the skilled person will even better understand the meaning of the present claims. A similar meaning is likewise applicable to claims 4-7, 15-18, 24 and 25.

In view of the foregoing discussion, and for arguments already of record, Applicant believes that Chirnside does not anticipate the present invention, at least since Chirnside does not disclose the combination the ORF sequences required and claimed by the present invention.

Accordingly, Applicant respectfully requests that the Examiner reconsider and withdraw the rejection under 35 USC 102.

III. Rejection under 103 over Chirnside in view of Krieg

At pages 10-11 of the Action, the Examiner rejects claims 9-12 under 35 USC 103 as obvious over Chirnside and Krieg (Trends in Microbiol. 6(1):23-27 (1998)). As indicated above and throughout correspondence presented in this application, the present invention is expressly limited to nucleic acids "consisting of" ORFs 2+5+7 with the indicated sequences, and does not include any other ORFs. Applicant therefore respectfully submits the present invention is not obvious in view of the combination of Chirnside and Krieg.

At least in view of the foregoing discussion, and for arguments already of record, Applicant considers that *prima facie* obviousness has not been established, and respectfully requests that the Examiner reconsider and withdraw this rejection.

IV. Rejection under 103 over Chirnside in view of Gregoriadis

At page 12 of the Action, the Examiner rejects claim 14 under 35 USC 103 as obvious over Chirnside and Gregoriadis (1997). As indicated above and throughout correspondence presented in this application, the present invention is expressly limited to nucleic acids "consisting of" ORFs 2+5+7 with the indicated sequences, and does not include any other ORFs. Applicant therefore respectfully submits the present invention is not obvious in view of the combination of Chirnside and Gregoriadis.

At least in view of the foregoing discussion, and for arguments already of record, Applicant considers that *prima facie* obviousness has not been established, and respectfully requests that the Examiner reconsider and withdraw this rejection.

V. CONCLUSION

In view of arguments set forth above, Applicants kindly submit that the rejections to the present application in the Office Action mailed on June 24, 2009 have been overcome, and that the pending claims are in good condition for grant. Accordingly, Applicant requests that the Examiner rejoin the withdrawn claims and issue a notification of allowance.

In the event that the Examiner maintains any rejections in this application, Applicant respectfully requests that the Examiner point out specific passages of the cited documents that support the Examiner's case against the patentability of the present invention, so that the Applicant may more closely consider the Examiner's concerns.

Applicants presently enclose a Petition for an "Extension for Response within Second Month" (small entity). Please charge the **$245.00** fee as set forth in Fee Code 2252 per 37 C.F.R. 1.17(a)(2), which is submitted herewith on enclosed **Form PTO-2038**. No other fees are believed to be due in connection with this correspondence.

If the Examiner believes that a telephone call would expedite the allowance of the present case, the Examiner is respectfully requested to contact Applicant's undersigned attorney at the number indicated below.

Communication using email has been authorized by Applicant's attorney.

Respectfully submitted,

Dated: November 20, 2009

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